INCH-POUND
ATPD 2237
9 January 1998
SUPERSEDING
MIL-R-46710B(AT)
1 August 1984

PURCHASE DESCRIPTION

# RECOVERY VEHICLE, FULL-TRACKED: LIGHT, ARMORED, M578; PROCESSING FOR STORAGE AND SHIPMENT OF

This purchase description is approved for use by U.S. Army Tank-automotive and Armaments Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This purchase description covers the processing of the M578 Armored, Light, Full-Tracked, Recovery Vehicle, 8736340, for storage and shipment.

1.2 Classification. Processing should be of the following levels, as specified (see 6.2):

Level A - Maximum military protection. Level A is the processing required for the protection of vehicle during shipment, handling, and storage exceeding 90 days from date of actual processing. This level does not provide for driveaway capability. It does provide for domestic or overseas shipment, including open deck loading.

Level B - Minimum military protection. Level B is the limited processing required for the protection of vehicle during shipment, handling, and storage not to exceed 90 days from date of actual processing. This level provides for driveaway capability, when specified, and domestic or overseas shipment (excluding open deck loading).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

AMSC N/A AREA PACK

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this purchase description. This section does not include documents cited in other sections of this purchase description or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3 and 4 of this purchase description, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

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| A-A-203 | - Paper, Kraft, Untreated. |
| A-A-208 | - Ink, Marking, Stencil, Opaque (Porous and Non-Porous Surfaces). |
| A-A-870 | - Antifreeze/Coolant, Engine: Ethylene Glycol, Inhibited Concentration. |
| A-A-883 | - Tape, Pressure Sensitive Adhesive, Masking. |
| A-A-1898 | - Cushioning, Materials, Cellulosic, Packaging. |
| A-A-52518 | - Tire, Pneumatic: Retread and Repair Materials (Metric). |
| A-A-52624 | - Anti-Freeze, Multi Engine Type. |
| O-S-801 | - Sulfuric Acid, Electrolyte: for Storage Batteries. |
| VV-L-800 | - Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature). |
| PPP-B-601 | - Boxes, Wood, Cleated-Plywood. |
| PPP-B-621 | - Box, Wood, Nailed and Lock Corner. |
| PPP-B-1055 | - Barrier Material, Waterproof, Flexible. |

DEPARTMENT OF DEFENSE

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| MIL-C-450 | - Coating Compound, Bituminous, Solvent Type, Black (for Ammunition). |
| MIL-PRF-2105 | - Lubricating Oil, Gear, Multipurpose (Metric). |

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| MIL-C-5501/7 | - Caps and Plugs, Protective, Dust and Moisture Seal (Cap-Plug, General Purpose). |
| MIL-PRF-10924 | - Grease, Automotive and Artillery. |
| MIL-B-11188 | - Batteries, Storage: Lead Acid, General Specification for (Metric). |
| MIL-P-14232 | - Parts, Equipment and Tools for Army Materiel, Packaging of. |
| MIL-PRF-16173 | - Corrosion Preventive Compound, Solvent Cutback, Cold-Application. |
| MIL-L-21260 | - Lubricating Oil, Internal Combustion Engine, Preservative and Break-In. |
| MIL-I-22110 | - Inhibitors, Corrosion, Volatile, Crystalline Powder. |
| MIL-B-22191 | - Barrier Materials, Transparent, Flexible Heat Sealable. |
| MIL-T-37402 | - Tester, Antifreeze Solutions. |
| MIL-P-46002 | - Preservative Oil, Contact and Volatile Corrosion-Inhibited. |
| MIL-L-46167 | - Lubricating Oil, Internal Combustion Engine, Arctic. |
| MIL-C-46168 | - Coating, Aliphatic Polyurethane, Chemical Agent Resistant. |
| MIL-T-50036 | - Talc, Technical, T1 and T3. |
| MIL-P-52905 | - Paint, Camouflage, Removable. |
| MIL-A-53009 | - Additive, Antifreeze Extender, Liquid Cooling Systems. |
| MIL-V-62038 | - Vehicle, Wheeled; Preparation for Shipment and Storage of. |

STANDARDS

DEPARTMENT OF DEFENSE

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| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-2073 | - Standard Practice for Military Packaging. |

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

ARMY

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| 10881915 | - Strut. |
| 10881916 | - Kit, OVE Rack. |
| 10881917 | - Bracket. |
| 10914995 | - Kit, Vehicle Closure. |
| 10919932 | - Bracket. |
| 10919933 | - Bracket. |
| 10919967 | - Stringer. |
| 10919968 | - Support. |
| 10919969 | - End. |
| 10919979 | - Hull Modification. |

(Copies of these drawings are available from the U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

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| ANSI/AWCI 01 | - Wire Fabric (Industrial). |

(Application for copies should be addressed to American National Standard Institute, 11 West 42nd Street, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

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| ASTM D1974 | - Standard Practice for Methods of Closing, Sealing and Reinforcing Fiberboard Boxes (DoD Adopted). |
| ASTM D3953 | - Standard Specification for Strapping, Flat Steel and Seals (DoD Adopted). |
| ASTM D4675 | - Selection and Use of Flat Strapping Material (DoD Adopted). |
| ASTM D5118/5118M | - Standard Practice for Fabrication of Fiberboard Shipping Boxes (DoD Adopted). |
| ASTM D5330 | - Standard Specification for Pressure Sensitive Tape for Packaging, Filament-Reinforced (DoD Adopted). |

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| ASTM D5486 | - Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing (DoD Adopted). |

(Application for copies of should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

ASSOCIATION OF AMERICAN RAILROADS PUBLICATIONS

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| Section No. 1 | - General Rules Governing Loading of Commodities on Open Top Cars. |
| Section No. 6 | - Rules Governing the Loading of Department of Defense Material on Open Top Cars. |

(Application for copies should be addressed to the Association of American Railroads, Publication Department, 50F Street NW, Washington, DC 20001-1564.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2. Approval of this vehicle shall not relieve the contractor of his obligation to process all vehicles in accordance with this purchase description. Unless otherwise specified by the acquisition activity, any change to materials or design after approval shall require additional vehicles be inspected as specified in 4.2. The Government representatives shall select the vehicle to be inspected.

3.2 Materials. Materials shall be as specified herein and on the standards, specifications, and drawings referenced herein (see 4.5.1).

3.3 Processing. Processing levels A and B shall be as specified below, with level B processing modified where specified.

3.3.1 Preparation prior to processing. Except as otherwise specified herein, and to the maximum extent consistent with production efficiency, economy, and safe storage and shipment, the vehicle shall be prepared for storage and shipment in a completely assembled condition after test runs, and completion and approval of all necessary repairs. Specified equipment shall be installed and all adjustments made so that the vehicle may be operated, shipped, and placed into service with a minimum of delay.

3.3.1.1 Processing records. Records of vehicle processing shall be maintained and shall be readily available for review by Government representatives.

3.3.2 Disassembly. Projecting parts whose removal will accomplish desired cube reduction, and parts susceptible to damage and pilferage, shall be removed from the vehicle. Removed bolts, nuts, screws, pins, and washers shall be placed in one of the mating parts and secured. Removed parts shall be packaged, identified, and stowed securely within the vehicle.

3.3.2.1 Matchmarking. Parts removed from the vehicle shall be matchmarked when necessary to facilitate reassembly. Matchmarking information shall be put on cloth shipping tags or on metal tags using waterproofed ink or paint, and attached to mating parts. The marked cloth shipping tags shall be waterproofed with a water resistant spar varnish, a water resistant paper label adhesive or any other suitable colorless waterproofing material.

3.3.3 Record forms. Two copies of DD Form 1397 shall be completed with information that includes preservation accomplished and depreservation instructions. The Equipment Log Book Binder and one copy of DD Form 1397 (see 6.4) shall be placed in a heavy duty waterproof transparent 6 mil plastic bag; the bag shall be closed by heat sealing and securely attached in the driver's compartment of vehicle. The other copy of DD Form 1397 shall be waterproofed with a water resistant paper label adhesive or any other suitable colorless waterproofing material, or sealed in a plastic bag, and securely attached in a conspicuous location on the exterior of the vehicle.

3.3.4 Cleaning and drying (see 4.5.2.1).

3.3.4.1 Interior of vehicle. Interior surfaces of vehicle shall be cleaned with water and a commercial concentrated, heavy-duty, nonabrasive, synthetic organic detergent or a water-soluble nonionic detergent which is effective and rinsable with either fresh water or sea water. Solution temperature shall not exceed 210 degrees Fahrenheit (°F) (100 degrees Celsius (°C)), and pressure shall not exceed 5 pounds per square inch (psi) measured 4 inches from the nozzle. After cleaning, cleaned surfaces shall be rinsed with clean water and dried. Care shall be taken during cleaning and rinsing operations to assure that no solution or water enters instruments, connections, or other components susceptible to water damage. Solution or water shall not accumulate and remain in cavities that cannot be drained. Vehicles with decals, markers, straps, and floor plates installed shall only be hand cleaned to prevent damage to these components. Cleaned surfaces shall be hand rinsed and dried (see 4.5.2.1).

3.3.4.1.1 Cleaning and drying of battery supports and retainers. Battery supports and retainers shall be cleaned with a solution of one-half pound of sodium bicarbonate per gallon of water. After cleaning, cleaned surfaces shall be flushed with clean water, then thoroughly dried. Dried surfaces shall then be preserved in accordance with 3.3.5.2.

3.3.4.1.2 Cleaning and drying of backrests, seats, and crash pads. The backrest, seat cushions, and crash pads shall be cleaned with a commercial concentrated, heavy-duty, nonabrasive, synthetic organic detergent or a water-soluble nonionic detergent which is effective and rinsable with either fresh water or sea water, in warm water. After cleaning, cushions shall be wiped with cloths saturated with clean water to remove cleaning solution. Care shall be taken not to saturate the cushions with cleaning solution or water. After rinsing, the cushions shall be dried, then protected in accordance with 3.3.16.

3.3.4.1.3 Fuel filter cases. The fuel filter cases, except when they are new, clean, and prior to engine preservation (see 3.3.5.5), shall be drained, removed and cleaned by any suitable process or processes which are not injurious to the item. After drying by any applicable procedure specified therein the fuel filter cases shall then be reinstalled using new gaskets.

3.3.4.2 Exterior of vehicle. The exterior of vehicle shall be cleaned with a commercial concentrated, heavy-duty, nonabrasive, synthetic organic detergent or a water-soluble nonionic detergent which is effective and rinsable with either fresh water or sea water, in warm water or steam. Cleaning shall remove all foreign matter. After cleaning, cleaned surfaces shall be rinsed with clean water or steam and thoroughly dried. Care shall be taken to avoid entry of water or steam into the driver's or engine compartments.

3.3.5 Preservation.

3.3.5.1 Relubrication. If the vehicle has been operated more than 50 miles since lubrication, or after the vehicle has been cleaned in accordance with 3.3.4.2, the vehicle shall be relubricated using materials conforming to drawings, specifications or lubrication order applicable to the vehicle. All exposed oil can points such as, but not limited to, levers, locking levers, locking bars, locking pins, pintle pins, hinge pins, hinges, strikers, wing nuts, door locks, hand-operated locking knobs, latches, linkage, threaded ends of yokes and related clevis pins shall be coated with lubricant conforming to VV-L-800. Excess lubricant shall be removed after coating.

3.3.5.2 Preservation of battery supports and retainers. Top battery supports and retainers shall be preserved with compound conforming to composition G, type I or II of MIL-C-450.

3.3.5.3 Transmission, final drives and auxiliary drive gear box. Transmission, final drives and auxiliary drive gear box shall be filled to operating level with lubricant in accordance with lubrication orders. If preservative oil is used, fill with Grade 10W, 30 or 50, as applicable, in accordance with MIL-L-21260. Operating lubricant and preservative oil shall not be mixed. DD Form 1397 shall be annotated with the grade of lubricant or preservative oil used (see 3.3.3).

3.3.5.4 Engine crankcase preservation. The crankcase shall be filled to operating level with lubricating oil conforming to MIL-L-21260 of the seasonal grade specified in the applicable drawing, specification, or lubrication order. DD Form 1397 shall be annotated with the type and grade of lubricant used.

3.3.5.5 Engine preservation. For level A processing, the engine preservation shall be an uninterrupted sequence in accordance with 3.3.5.5.2 through 3.3.5.5.5.

3.3.5.5.1 Level B. For level B processing, the engine shall be preserved in accordance with 3.3.5.5.4 and 3.3.5.5.5 only. Preservation through the fuel system (see 3.3.5.5.2) and through the combustion chamber (see 3.3.5.5.3) shall not be required.

3.3.5.5.2 Preservation through fuel system. An auxiliary fuel container, equipped with a fuel line shall be filled with a sufficient amount of preservative oil conforming to grade 1 of MIL-P-46002 to which an organic, oil soluble red dye has been added, in a concentration sufficient to impart a marked coloring to the oil, to operate the engine as prescribed below (see 6.5). The dye shall not harm any component or material it comes into contact with. The container shall be arranged to provide adequate pressure to allow a proper supply of the preservative oil into the combustion chambers. The fuel line shall be disconnected at the most convenient point nearest to the vehicle fuel tank. The line from the auxiliary fuel container shall be connected to the fuel-to-engine line at the point of disconnect. The vehicle fuel return line shall be disconnected at the quick disconnect coupling. A transparent plastic line shall be connected to the disconnected vehicle fuel return line and the other end inserted into a recovery container to collect the returned diesel fuel. The fuel valve on the auxiliary fuel container shall be turned to the “ON” position. The engine shall be started and operated not over 1200 revolutions per minute (rpm) until observed fuel return is purged of diesel fuel. The plastic fuel return line shall then be switched to an auxiliary container to recover the undiluted preservative oil. The engine shall be operated on the preservative oil for not more than one minute after the oil appears through the transparent plastic line. The engine shall then be accelerated to three-fourths of the maximum speed for approximately 15 seconds and then shut-off.

3.3.5.5.3 Preservation through combustion chamber. After preservation through the fuel system, with the container still connected (see 3.3.5.5.2), the auxiliary fuel tank shall be refilled with enough preservative oil conforming to grade 1 of MIL-P-46002 to assure a proper supply. The engine shall be cooled to a cylinder head temperature of not more than 100°F (38°C), before engine preservation is continued. Induced air currents may be used to accelerate engine cooling. Engine rocker arm covers shall be removed to gain access to valve mechanisms. One valve of each cylinder shall be fixed in an open position by inserting a 0.040 inch (maximum) spacer between the valve and the rocker arm to release compression. The fuel valve on the auxiliary fuel container shall be turned to the “ON” position. The accelerator shall be depressed to full fuel flow and the engine shall then be cranked for a period of not less than 30 seconds and not more

than 40 seconds. After cranking, the spacers shall be removed and rocker arm covers reinstalled. The auxiliary fuel container shall be removed and the vehicle fuel and return lines reconnected.

3.3.5.5.4 Preservation through air intake and exhaust systems. After preservation through the fuel system (see 3.3.5.5.2) and combustion chamber (see 3.3.5.5.3), the engine crankcase breathers shall be sealed with plastic caps conforming to table I of MIL-C-5501/7, or tape conforming to ASTM D5486. Seven tenths of an ounce (oz) (20 g) of volatile corrosion inhibitor compound (VCI) conforming to type I of MIL-I-22110 shall be fogged into the exhaust outlet opening. The opening shall then be sealed with tape conforming to ASTM D5486. The hose shall be disconnected from the air duct in the crew compartment and 0.5 oz (15 g) of VCI shall be fogged into the air duct opening. The opening shall then be sealed with a plastic plug or tape conforming to ASTM D5486. A red warning tag, bearing information "ENGINE PRESERVED WITH VCI AND OIL - DO NOT CRANK" and "BEFORE CRANKING, REMOVE CAPS, TAPE AND PLUG, AND REINSTALL HOSE" shall be placed in a conspicuous location within the driver's compartment. DD Form 1397 shall be annotated to show the engine is preserved with VCI and oil and openings are sealed.

3.3.5.5.5 Preservation through dipstick shroud opening. After the preservation specified in 3.3.5.5.2, 3.3.5.5.3, and 3.3.5.5.4, the dipstick shall be removed and six oz (170 g) of lubricating oil conforming to grade 1 of MIL-P-46002 shall be sprayed in atomized form into the crankcase through the dipstick shroud opening. An extension nozzle of sufficient length to allow the spraying nozzle to be within the crankcase shall be used. The nozzle shall be submerged in the oil within the crankcase. The dipstick shall be reinstalled. All openings leading to the interior of the engine, including the dipstick shroud opening and oil filler cap, shall be sealed with tape conforming to ASTM D5486.

3.3.5.6 Fuel tank. After engine preservation, the fuel tank shall be drained to the extent possible. The fuel tank shall be atomized sprayed with lubricating oil conforming to grade 30 of MIL-L-21260 in a manner to assure complete coverage of all interior surfaces. The fuel tank cap and filler screen shall be removed and coated with the grade 30 preservative oil and reinstalled (see 4.5.2.2).

3.3.5.6.1 Level B. Unless otherwise specified (see 6.2), vehicles processed according to the level B shall be shipped without draining residual fuel from the fuel tanks.

3.3.6 Cooling system. The cooling system shall be protected by one of the following procedures (see 4.5.2.3 and 6.2):

a. For shipment to, and storage in, areas where the temperature drops below minus (-) 40°F (-40°C), systems shall be protected as specified in 3.3.6.3.

b. For shipment and storage within the bounds of 30 degrees north latitude and 20 degrees south latitude, except continental United States, systems shall be protected as specified in 3.3.6.2.
c. For all other shipments, cooling systems shall be protected as specified in 3.3.6.1.

NOTE: DD Form 1397 (see 3.3.3) shall be completed to indicate coolant used.

3.3.6.1 Water and antifreeze procedure. The cooling system shall be filled to operating level with a clean solution consisting of equal parts by volume of antifreeze (ethylene glycol) conforming to A-A-870, and water. The engine shall be operated until a temperature has been reached that causes the thermostat to open, to assure complete mixing and even distribution of the antifreeze solution. A warning tag, bearing the information "COOLING SYSTEM FILLED WITH WATER AND ANTIFREEZE SOLUTION (ETHYLENE GLYCOL) IN EQUAL PARTS BY VOLUME - DO NOT DRAIN", shall be securely attached to the radiator filler neck.

3.3.6.2 Water and corrosion inhibitor procedure. The cooling system shall be filled with clear water up to the radiator upper tank. A corrosion inhibitor conforming to MIL-A-53009 shall be added in the proportion of 5 oz (140 g) of the inhibitor for each 10 quarts (qt) (9.5 liters (L)) of water. The inhibitor shall be dissolved in 2 qt (1.9 L) of warm water and poured into the radiator while the engine is idling. More water shall be added, if necessary, to fill the radiator to operating level. A warning tag, bearing the information "COOLING SYSTEM DOES NOT CONTAIN ANTIFREEZE - FILLED WITH WATER AND INHIBITOR", shall be securely attached to the radiator filler neck.

3.3.6.3 Antifreeze compound procedure. The cooling system shall be filled to operating level with antifreeze compound conforming to A-A-52624. The compound shall be used without dilution. A warning tag, bearing the information "COOLING SYSTEM FILLED WITH ANTIFREEZE (ARCTIC-TYPE) - DO NOT DRAIN", shall be securely attached to the radiator filler neck.

3.3.7 Batteries, cables, and electrolyte.

3.3.7.1 Dry charged batteries and cables. Dry charged batteries shall be installed and secured in the vehicle battery carrier. Battery cables shall be secured to the battery carrier with 0.75 in. (19 mm) tape conforming to ASTM D5330. Battery filler cap openings shall be sealed by placing a 2 in. (51 mm) wide by 3 mil thick piece of film conforming to type II of MIL-B-22191 over each filler cap opening with the cap removed. The sheet shall be of sufficient length to allow it to be depressed into the opening to the same depth, as the filler plug. Filler caps shall be screwed or inserted into openings to form a complete seal without damaging the sheet. If batteries have been processed in accordance with MIL-B-11188, they need not be reprocessed as above.

3.3.7.2 Electrolyte. Electrolyte shall be packaged and packed in accordance with O-S-801, except that the exterior container shall conform to PPP-B-621, Class 2, or PPP-B-601, overseas type. Marking shall conform to O-S-801. The packed electrolyte shall be stowed in the same location as the BII and secured independently to permit separate removal.

3.3.8 Traverse ring gear. All exposed unpainted surfaces of the traverse ring gear shall be coated with grease conforming to MIL-PRF-10924.

3.3.9 Spade. The spade shall be extended from the retracted position. Approximately one in. (25 mm) of exposed surface of hydraulic piston rods shall be coated with grease conforming to MIL-PRF-10924. The spade shall then be returned slowly to full retracted position.

3.3.10 Winch and derrick assembly. The winch gearcase and other related gear driven units shall contain the applicable grade of gear lubricant conforming to MIL-PRF-2105, filled to the operating level. The wire cable shall be unreeled and all surfaces shall be coated with preservative conforming to grade 1 of MIL-PRF-16173. While the cable is being rewound, any damage to applied preservative coating shall be repaired by application of additional preservative of the same type and grade to damaged areas. All exposed unpainted metal surfaces of cable drums, sheaves, snatch blocks, boom block, crane or derrick boom, controls, and linkage shall be coated with preservative conforming to grade 1 of MIL-PRF-16173. All moving, mating parts shall be coated with grease conforming to MIL-PRF-10924. The hydraulic system shall contain lubricating oil, conforming to MIL-L-46167 filled to operating level. When operating surfaces of the hydraulic piston rod or ram are exposed they shall be coated with grease conforming to MIL-PRF-10924.

3.3.11 Machine-gun mount. The machine-gun mount shall be removed, cleaned, coated with grease conforming to MIL-PRF-10924, then overwrapped in barrier material conforming to PPP-B-1055. The barrier material shall be secured with tape conforming to ASTM D5486, identified and stowed inside the cab and secured in a manner to prevent movement during shipment.

3.3.12 Miscellaneous securement. The following items shall be secured in their normal stowed position on the vehicle as identified. When necessary to provide secure stowage, strapping conforming to ASTM D3953 and ASTM D4675 shall be used. The securement shall be accomplished without increasing vehicle cube.

a. Portable fire extinguisher on left interior of cab.
b. Towing bar on right fender.
c. Snatch block on left front of cab.
d. Snatch block in tray on bottom of boom.
e. Two towing cables, one on each side of boom.
f. Lifting chain in exterior cab stowage compartment.

g. Two 4 foot (ft) (1.2 m) chains in exterior cab stowage compartment.
h. Two 6 ft (1.8 m) chains in exterior cab stowage compartment.
i. Tow chain in exterior cab stowage compartment.
j. Acetylene cylinder on cab exterior.
k. Oxygen cylinder on cab exterior.
l. Six track shoes on deck.

3.3.13 Vision blocks. Vision blocks shall be removed, wrapped in 2 layers of cushioning material conforming to A-A-1898 then overwrapped in paper, having a minimum basis weight of 60 pounds (lb) (27 kilogram (kg)), conforming to A-A-203. The paper shall be secured with tape conforming to type I of A-A-883. The wrapped vision blocks shall be placed in a box conforming to ASTM D1974, identified, stowed, and secured inside cab in a manner to prevent movement during shipment.

3.3.14 Cloth items. Cloth items such as canvas shall be thoroughly dried, folded or rolled in a manner to avoid damage, packaged in accordance with MIL-STD-2073-1, and packed in a nailed wood box conforming to PPP-B-621. The box shall be identified and stowed with the Basic Issue Items (BII).

3.3.15 Hydraulic systems. Hydraulic systems shall be filled to operating level with lubricating oil conforming to MIL-L-46167.

3.3.16 Backrests, seats, and crash pads. Immediately after drying (see 3.3.4.1.2), cushioned portions of backrests, seats, and crash pads shall be covered with paper, having a minimum basis weight of 60 lb (27 kg), conforming to A-A-203. The paper shall be secured with tape conforming to type I of A-A-883.

3.3.17 Hatches and doors. Rubber seals around hatches and doors shall be coated with powered talc conforming to A-A-52518 or MIL-T-50036. For shipment, hatches and doors shall be closed and locked, except that the driver's hatch shall be secured with an approved railroad type seal placed through the locking lugs. For storage, the driver's hatch shall be secured in the open position for ventilation.

3.3.17.1 Level B. For level B processing, coating rubber seals with talc shall not be required.

3.3.18 Fire extinguishers. Fire extinguishers shall have a minimum of 90 percent of rated full charge. All seals shall be intact. DA Form 253 shall be completed and securely attached to each extinguisher (see 6.3).

3.3.19 Miscellaneous preservation. Except as otherwise specified herein, all exposed, unpainted, metal surfaces on the exterior of the vehicle, except the track shoes, shall be coated with compound conforming to Grade 1 of MIL-PRF-16173. All exposed, unpainted, unplated, metal surfaces on the interior of the vehicle shall be coated with compound conforming to Grade 4 of MIL-PRF-16173.

3.3.20 Basic issue item. Except as otherwise specified herein, all spare parts, tools, equipment and other unit packages shall be packaged level A in accordance with MIL-P-14232, or the applicable packaging data sheet. The packaged items shall be packed level A and marked in accordance with MIL-V-62038. The pack shall be identified to the pertinent vehicle by serial number and, except during shipment, shall be stored inside buildings.

3.3.21 Vehicle closure. The vehicle shall be provided with a covered wagon-style closure in accordance with drawing 10914995. The closure shall be fabricated, assembled, and installed in accordance with the appendix and drawings. All sharp corners of the framework and bows where cloth cover will make contact, such as corners of the base of the frame, shall be cushioned. To lift the vehicle for loading, the cover shall be rolled away from the front and rear bows to expose the vehicle lifting eyes.

3.3.21.1 Ventilation. The turret well access door shall be secured in the open position with wire. The transmission and radiator drain (left side) access plates and gaskets on the underside of vehicle shall be removed for ventilation. Unpainted metal surfaces of access plates, and surfaces exposed by removal of these items shall be coated with preservative conforming to grade 1 of MIL-PRF-16173. Plates and gaskets shall be placed in a box conforming to ASTM D1974, identified, and stowed within cargo compartment in a manner to prevent movement in transit. The following information shall be stenciled on the exterior of the vehicle “REMOVE SCREENS, INSTALL ACCESS PLATES AND GASKETS, AND CLOSE TURRET WELL ACCESS DOOR BEFORE VEHICLE OPERATION”. The stenciling color shall be white or yellow, using paint conforming to MIL-P-52905. Stenciling shall be in characters at least 0.75 in. (19 mm) high.

3.3.21.1.1 Screens. Screens (see figure 1) constructed of wire cloth, 0.047 inch diameter, 4 by 4 mesh, conforming to ANSI/AWCI 01 shall be installed in the transmission and radiator drain access plate openings (see figure 2). Another screen shall be placed over the turret well opening and secured with tape conforming to ASTM D5486, from the inside of the vehicle.

3.3.22 BII containers.

3.3.22.1 Domestic shipment. Unless otherwise specified (see 6.2), for domestic shipment BII containers shall be placed on the floor of the railroad car and blocked, braced, and anchored to prevent movement in transit. Corner protectors shall be used under the strapping.

3.3.22.2 Oversea shipment. For oversea shipment, BII containers shall be placed on vehicle equipment rack (see 3.3.22.2.1) in a position which will not increase the overall cube of the vehicle. Each large wood box, such as those containing manufacturer and depot BII, shall be secured with two 1.25 in. (32 mm) strappings in each direction. Smaller BII boxes shall be secured to larger BII boxes or racks with 0.75 in. (19 mm) strapping. The strapping shall conform to type I, class B of ASTM D3953 and ASTM D4675. Wood blocking shall be used as necessary to reinforce racks. Corner protectors shall be used under strapping.

3.3.22.2.1 BII rack. The vehicle shall be provided with an BII rack constructed, and assembled in accordance with 10881916 and mounted in accordance with 10919979. The BII rack shall be installed as follows:

a. Attach strut 10881915 to hull using screws and lockwashers.
b. Attach brackets 10881917 to hull using screws and lockwashers.
c. Fit ends 10919969 over ends of stringers 10919967 and secure with lag bolts, lockwashers and plain washers.
d. Attach supports 10919968 to stringers 10919967 using bolts, washers and nuts.
e. Secure assembled rack to brackets 10881917 and strut 10881915 using bolts, washers and nuts.

3.3.23 Packaging of tow hooks. Tow hooks and related hardware shall be removed for shipment and packaged in a Type CF, Class Weather-Resistant box conforming to ASTM D5118/ D5118M. The box shall be closed in accordance with method 4B2 of ASTM D1974, identified as to contents, and securely stowed within the personnel compartment.

3.3.24 Loading. Loading of vehicles on open top railroad cars shall be in accordance with the applicable requirements of Section 1, General Rules Governing the Loading of Commodities on Open Top Cars and figure 87 or 87A, Section 6, Rules Governing the Loading of Department of Defense Material on Open Top Cars, publication of the Association of American Railroads (see 2.3). The parking brake shall be set.

3.3.25 Reprocessing engine after loading. If the engine is operated in connection with loading, or moving the vehicle to a loading area, the engine shall be reprocessed as specified in 3.3.5.5. An auxiliary fuel tank shall supply the fuel. If installed, the vehicle cover shall be rolled clear of engine intake and exhaust (see 3.3.25.1) to provide air circulation and to prevent damage to the cover. After reprocessing of the engine, the vehicle cover shall be restored to its original position.

3.3.25.1 Instructions for rolling cover back. The vehicle cover shall be rolled back as follows:

a. Unfasten apron of cover from brackets 10919932 and 10919933 back to third bow of frame from front.
b. Open clamps attached to those brackets from which cover apron has been unfastened and remove freed tie rods.
c. Open sliding fastener at front of cover and roll cover back to second rod.
d. Tuck cover apron between frame and deck on right side to clear exhaust openings.

3.3.26 Marking. In addition to any special marking required in the contract (see 6.2), the vehicle shall be marked in accordance with MIL-STD-129 (see 6.6).

3.3.26.1 Lifting points. The information "LIFT HERE" with an arrow pointing to the lifting eye shall be stenciled adjacent to each lifting eye using black ink conforming to A-A-208.

3.3.26.2 Closure marking. The information "TO LIFT VEHICLE FOR LOADING, UNFASTEN AND ROLL COVER FROM FRONT AND REAR BOWS EXPOSING LIFTING EYES," shall be stenciled in a conspicuous location on the front and rear of the vehicle closure, using lacquer conforming to MIL-C-46168, except that the color shall be white. Stenciling shall be in characters at least 0.75 in. (19 mm) high. The information "CLOSURE KIT, VEHICLE PROTECTIVE - M578 - DO NOT DESTROY - REINSTALL FOR SHIPMENT OR STORAGE OR SHIP WITH OVE" shall be stenciled in a conspicuous location on one end and one side of the vehicle closure, using lacquer conforming to MIL-C-46168, except that the color shall be white. Stenciling shall be in characters at least 2 in. (51 mm) high.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).
b. Conformance inspections (see 4.5).

4.2 First article inspection. First article inspection shall be performed on one of the first 10 production processed vehicles when a first article sample is required (see 3.1). The vehicle shall be subjected to the inspections specified in 4.5 (see table I).

TABLE I. Processing inspection.
(see indicated paragraphs for level A and B requirements)

| Title | Cleaning Levels A and B | Preservation | | Packaging Levels A and B |
|---|---|---|---|---|
| | | Level A | Level B | |
| Preparation prior to processing | | | | 3.3.1 |
| Processing records | | | | 3.3.1.1 |
| Disassembly | | | | 3.3.2 |
| Record forms | | | | 3.3.3 |
| Cleaning & drying | 3.3.4 | | | |
| Vehicle interior | 3.3.4.1 | | | |
| Battery supports & retainers | 3.3.4.1.1 | | | |
| Backrests, seats, & crash pads | 3.3.4.1.2 | | | |
| Fuel filter cases | 3.3.4.1.3 | | | |
| Vehicle exterior | 3.3.4.2 | | | |
| Relubrication | | 3.3.5.1 | 3.3.5.1 | |
| Preservation of battery supports & retainers | | 3.3.5.2 | 3.3.5.2 | |
| Transmission, final drives & auxiliary drive gearbox* | | 3.3.5.3 | 3.3.5.3 | |
| Engine crankcase* | | 3.3.5.4 | 3.3.5.4 | |
| Engine preservation* | | 3.3.5.5 | 3.3.5.5.1 | |
| Preservation through fuel system | | 3.3.5.5.2 | | |
| Preservation through combustion chamber | | 3.3.5.5.3 | | |
| Preservation through air intake & exhaust systems | | 3.3.5.5.4 | 3.3.5.5.4 | |
| Preservation through dipstick shroud opening | | 3.3.5.5.5 | 3.3.5.5.5 | |
| Fuel tank | | 3.3.5.6 | 3.3.5.6.1 | |
| Cooling system* | | 3.3.6 | 3.3.6 | |
| Water & antifreeze procedure | | 3.3.6.1 | 3.3.6.1 | |
| Water & corrosion inhibitor procedure | | 3.3.6.2 | 3.3.6.2 | |
| Antifreeze compound procedure | | 3.3.6.3 | 3.3.6.3 | |
| Dry charge batteries & cables | | 3.3.7.1 | 3.3.7.1 | |
| Electrolyte | | 3.3.7.2 | 3.3.7.2 | 3.3.7.2.1 & 3.3.7.2.2 |
| Traverse ring gear | | 3.3.8 | 3.3.8 | |
| Spade | | 3.3.9 | 3.3.9 | |
| Winch & derrick assembly | | 3.3.10 | 3.3.10 | |
| Machine-gun mount | | 3.3.11 | 3.3.11 | |
| Miscellaneous securement | | 3.3.12 | 3.3.12 | |

TABLE I. Processing inspection - Continued.

| Title | Cleaning Levels A and B | Preservation | | Packaging Levels A and B |
|---|---|---|---|---|
| | | Level A | Level B | |
| Vision blocks | | | | 3.3.13 |
| Cloth items | | | | 3.3.14 |
| Hydraulic systems | | 3.3.15 | 3.3.15 | |
| Backrests, seats, & crash pads | | | | 3.3.16 |
| Hatches & doors | | 3.3.17 | 3.3.17.1 | |
| Fire extinguishers | | | | 3.3.18 |
| Miscellaneous preservation | | 3.3.19 | 3.3.19 | |
| Basic issue item | 3.3.20 | 3.3.20 | 3.3.20 | 3.3.20 |
| Vehicle closure | | | | 3.3.21 |
| Ventilation | | | | 3.3.21.1 |
| Screens | | | | 3.3.21.1.1 |
| BII containers | | | | 3.3.22 |
| BII rack | | | | 3.3.22.2.1 |
| Tow hooks | | | | 3.3.23 |
| Loading | | | | 3.2.24 |
| Reprocessing after loading | | 3.3.25 | 3.3.25 | |
| Marking | | | | 3.3.26 |
| Lifting points | | | | 3.3.26.1 |
| Closure marking | | | | 3.3.26.2 |

*Inspect DD Form 1397

4.3 Production processed vehicles. Unless otherwise specified (see 6.2), all production processed vehicles shall be subjected to the inspections specified in 4.5.2 through 4.5.2.3 (see table I).

4.4 Failure. Failure of the first article, or any production processed vehicle, to conform to the applicable requirements of this purchase description shall be cause for rejection of the vehicles by the Government. No vehicles shall be accepted until objective evidence that the contractor has corrected the condition causing the failure has been provided to the Government. A complete or partial reinspection may be required by the procuring activity at the contractors expense to substantiate any implemented corrective action.

4.5 Conformance inspections.

4.5.1 Materials. Except for materials that have been inspected by the Government at source, all materials to be used in processing of vehicles shall be inspected in accordance with the material specification; or certified inspection and laboratory test reports shall be provided which show that furnished materials conform to the applicable material specification.

4.5.2 Processing. Except as otherwise specified herein, vehicle processing shall be inspected to determine conformance to this purchase description. Inspection of processing shall include all items specified in Table I and 4.5.2 through 4.5.2.3.

4.5.2.1 Cleaning. To determine conformance to 3.3.4.1, the interior of vehicle shall be examined for cleanliness. One vehicle each day shall be tested for cleanliness in accordance with the applicable provisions of MIL-STD-2073. To determine conformance with 3.3.4.2, the exterior of vehicle shall be examined for cleanliness. Surfaces on which tape is to be applied shall be examined for cleanliness before application.

4.5.2.2 Fuel tank. To determine conformance to 3.3.5.6, visual inspection of preservative application shall be accomplished.

4.5.2.3 Cooling system. To determine conformance to 3.3.6, one processed vehicle shall be selected at random from each day's production. The engine coolant shall be tested using a hydrometer-thermometer type tester, with a range of -60 to +160°F (-50 to +70°C), conforming to MIL-T-37402.

5. PACKAGING

This section is not applicable to this purchase description.

6. NOTES

(This section contains information of a general or explanatory nature, that may be helpful, but is not mandatory.)

6.1 Intended use. This purchase description covers processing of the 8736340 vehicle (based on M110) for storage outside of buildings, immediate use, domestic or overseas and including carloading.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this purchase description.
b. Applicable level of processing (see 1.2).

c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3)
d. When first article inspection is required (see 3.1).
e. If draining of residual fuel from fuel tank is required for Level B processing (see 3.3.5.6.1).
f. Applicable procedure for protection of cooling system (see 3.3.6).
g. If installation of BII containers on the railroad car should be other than as specified (see 3.3.22.1).
h. If special marking is required (see 3.3.26).
i. If inspection should be other than as specified (see 4.3).

6.3 Safety precautions. Caution should be exercised in handling carbon dioxide (CO2) fire extinguisher cylinders. Cylinders should not be dropped, permitted to strike each other, or handled roughly. Extreme care should be exercised during the reinstallation operation to avoid tripping the fire extinguisher control trigger (see 3.3.18).

6.4 Forms. A copy of the "Equipment Log Book" and all required forms (see 3.3.3) will be furnished to the contractor by the Government at least 30 days before shipment of the vehicles required by the contract delivery schedule.

6.5 Oil soluble red dye. The following properties have previously proven to be effective for the requirements specified herein:

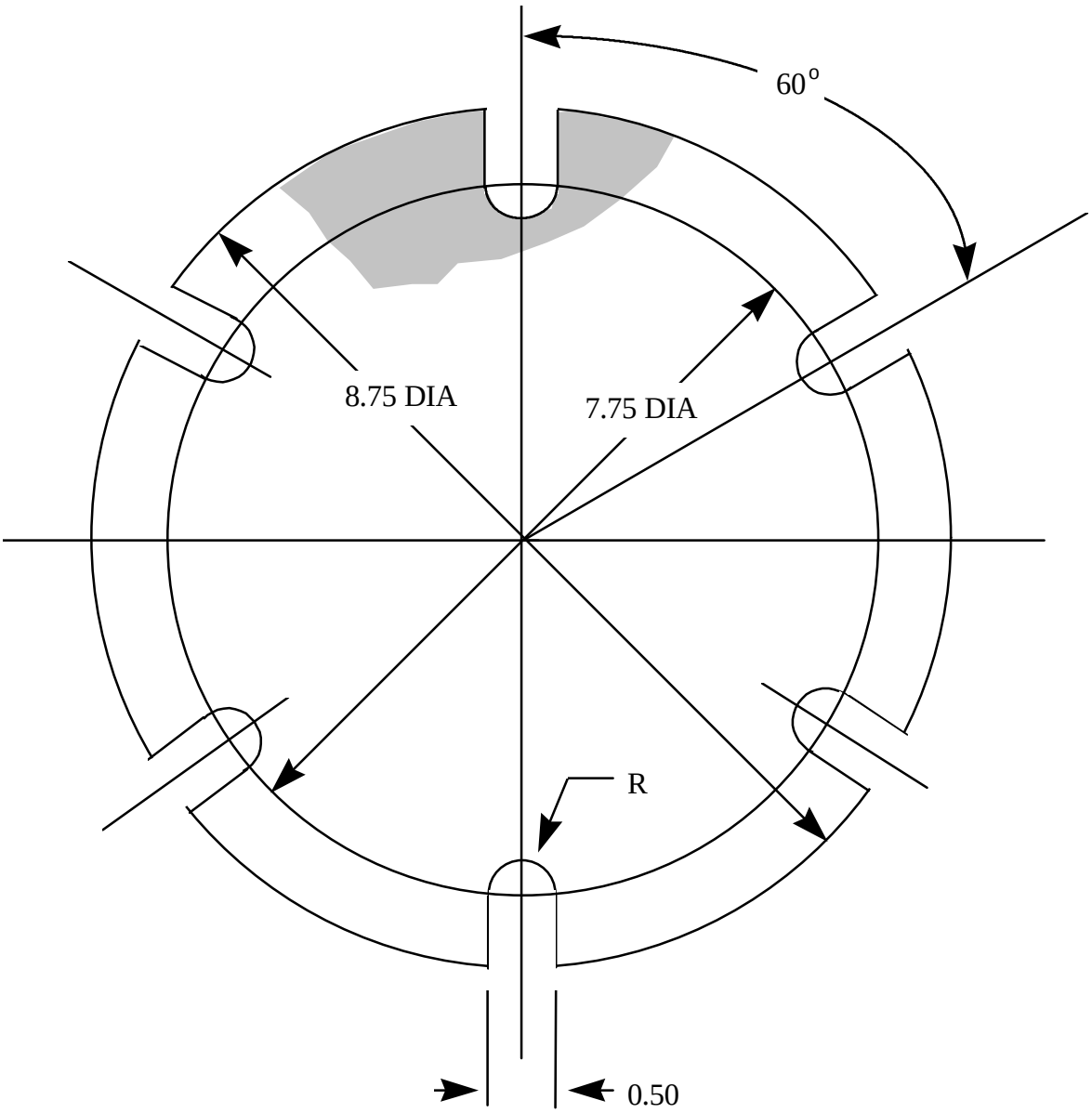
| Title | Requirement | Applicable standard |
|---|---|---|
| Pour point | -18°C (0°F) | ASTM D97 |
| Flash point, open cup (min) | 32°C (90°F) | ASTM D1310 |
| Flash point, closed cup (min) | 25°C (77°F) | ASTM D3278 |
| Moisture, percent (max) | 0.05% | ASTM D1744 |
| Contamination of aircraft fuel, mg/L (max) | 2 | ASTM D2276 |
| Thermal stability with 45.4g dye/378.5 L fuel (1.6 ounces dye/100 gal fuel) | - | ASTM D3241 |
| Color value (absorptivity) (min) | 30 | - |
| Wave length at max absorption, nm (max, min) | 522, 510 | - |

6.6 Marking. MIL-HDBK-129 provides information and application guidance on MIL-STD-129.

6.7 Subject term (key word) listing.

Doors
Hatches
Loading
Preservatives
Ramp winch assembly
Relubrication
Ventilation

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.




TOLERANCE - ± 0.03

FIGURE 1. Screen.

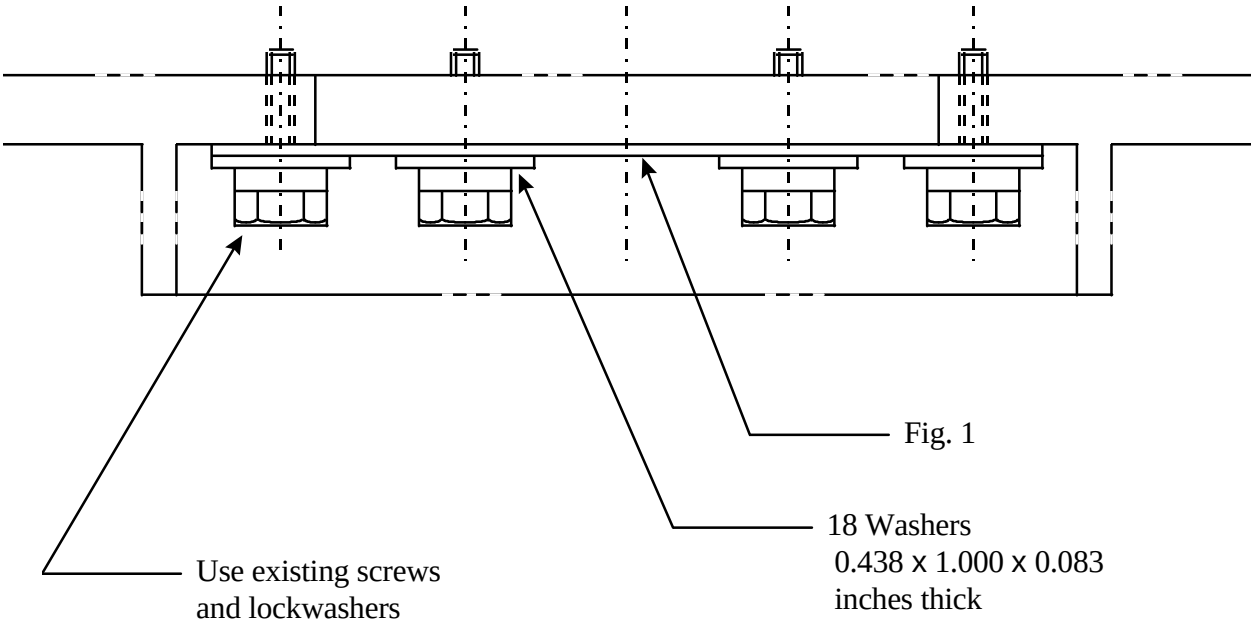



FIGURE 2. Drain access plate opening.

# APPENDIX A

## REQUIREMENTS FOR ASSEMBLY, INSTALLATION, AND REMOVAL OF VEHICLE CLOSURE FOR M578 VEHICLE

### A.1 SCOPE

A.1.1 This appendix covers requirements for assembly, installation, and removal of the vehicle closure (see 3.3.21).

### A.2 APPLICABLE DOCUMENTS. None

### A.3 REQUIREMENTS

A.3.1 Assembly and installation of closure. The vehicle closure 10914995 shall consist of a closure kit frame 10914996 and a cover 10914997 and subordinate drawings. The cover shall be attached after the frame has been installed on the vehicle in accordance with hull modification 10906906, and 10906907 and subordinate drawings. Drawings specified herein are referenced for interface and envelope dimensions, and any applicable performance requirements, and not intended to limit design or construction.

A.3.1.1 Frame installation. The closure frame shall be assembled and installed in accordance with the following instructions:

a. Attach struts 10908831 and 10908834 to hull using screws and lockwashers.
b. Attach brackets 10908836, 10908837-1, and 10908837-2 to hull using screws and lockwashers.
c. Attach brackets 10919924-1 and 10919924-2 to hull using screws and nuts.
d. Fasten base frame angles 10908551 and 10908552 to struts 10908834 using washers 10908548, screws and nuts.
e. Fasten base frame angles 10908551, 10908552, 10908561, 10915005-1, and 10915005-2 to brackets and to each other using angles 10908556, screws, and nuts.
f. Fasten front base frame angles 10908830-1 and 10908830-2 together and to strut 10908831 using angle 10908556, screws and nuts.
g. Fasten rear base frame angles 10908830-1 and 10908830-2 together using angle 10908556, bracket 10915006, screws, and nuts.
h. Fasten front and rear base frame angles to side base frame angles to form corner joints using screws and nuts.

i. Using 0.875 nuts and lockwashers, install brackets 10914998 and posts 10908550 on side base frame angles. Install outer brackets 10914998 on the front and rear of base frame angles using 0.875 screws and lockwashers.
j. Place bows 10908853 over posts 10908550 along each side of base frame. Slip tubes 10908828-2 onto connectors of tubes 10908848 and place this assembly over posts 10908550 at front and rear base frame.
k. Place links 10908557 and 10908558 over connectors of bows 10908853. Slip bows 10915007 and 10915008 over connectors of bows 10908853. Place remaining links 10908557 and 10908558 over connectors of bows 10915007. Slip plates of tubes 10908848 over connectors of bows 10915007 at front and rear. Insert connectors of bows 10915007 into opposing bows 10915008.
l. Install braces 10908835 using washers 10908548, screws, nuts, and clamps.

A.3.1.2 Installation of cover. The vehicle cover shall be installed over the closure frame in accordance with the following instructions:

a. Drape cover 10914997 over frame 10914996.
b. Slip rods 10908553 thru side loops and rods 10908555 thru front and rear loops in cover.
c. Attach studs 549198 to brackets 10919932 and 10919933 using screws with lockwashers attached.
d. Attach clamps 10922144 and brackets 10919933 to brackets 10914998 and strut 10908831 at front of frame using spacer 10919946 screws, nuts, and washers. Attach clamps 10922144 and brackets 10915006 at rear of frame using spacers 10919946 screws, nuts, and washers.
e. Position clamps to obtain good fit of cover by means of slotted holes in brackets 10914998. Secure rods 10908553 and 10908555 to brackets with clamps.
f. Close both ends of cover with sliding fasteners. Lock fasteners with cotter pins 590205.
g. Secure apron of cover to brackets 10919932 and 10919933 using turn-button stud fasteners 549198.

A.3.2 Removal of vehicle closure. The vehicle cover and frame shall be removed from the vehicle in a step by step procedure that is the reverse of the installation procedure (see A.3.1.1 and A.3.1.2).

ATPD 2237

Custodian:
Army - AT

Preparing Activity:
Army - AT

(Project PACK-A419)